

## Executive Summary

In 2001, Congress authorized the U.S. Fish & Wildlife Service to implement and fund a new program to help states proactively address the needs of declining wildlife species before they required listing as Endangered or Threatened. The **State Wildlife Grants (SWG)** program provides federal funding to every state and territory to conserve its wildlife resources of greatest conservation need. Wisconsin's *Strategy for Wildlife Species of Greatest Conservation Need* identifies:

1. which **native wildlife species** with low or declining populations are **most at risk** of no longer being a viable part of Wisconsin's fauna,
2. what **habitats** they are associated with,
3. **where they occur** across the state, and
4. a menu of **conservation actions** to be developed into specific on-the-ground projects to "get them off and keep them off" any Endangered or Threatened lists in the future.

### What this Strategy Will Do for Wisconsin:

- **Focus efforts** on those native wildlife species that are **most at risk** of becoming Endangered or Threatened, or are already listed as such by either the state or federal government. Wisconsin now has a scientifically-based system to identify our Species of Greatest Conservation Need.
- **Save money** by working to prevent species from becoming listed as Endangered or Threatened. The Strategy identifies **proactive** steps to take now in order to avoid having to implement expensive actions later needed to recover species when their populations have reached dire conditions.
- **Stress** the importance of protecting **habitats** as a means of protecting whole suites of species rather than focusing conservation efforts on individual species.
- Continue efforts to **coordinate and prioritize conservation actions** to benefit the largest number of Species of Greatest Conservation Need, as well as other game and non-game species, by providing information on threats and conservation needs from both habitat and regional perspectives.
- **Provide a reference document** and a dynamic **database** to support agencies, organizations, and individuals in meeting their conservation goals. The *Strategy* can help them identify how their interests match up with the priority conservation needs described in the document.
- **Build partnerships** and encourage collaborative approaches to conserving habitats and species at the local level. With input from partners, the Department will draft an implementation plan identifying which priority conservation actions it is best suited to address and how it can most effectively assist partners in their efforts.
- **Adapt** to changing circumstances. Not only can the database be periodically updated as new data are gathered, but partners and the Department can use the *Strategy* to help react to changing opportunities and threats.
- **Describe ongoing and future opportunities to monitor** Species of Greatest Conservation Need and their habitats as well as establish a process for periodically reviewing and revising the Strategy as new information becomes available.
- **Leverage** past efforts to benefit groups of species without introducing new regulations or constraints, **ensure Wisconsin remains eligible for federal funding** from the State Wildlife Grants Program, and help guide the future allocation of these funds.

## **Wisconsin's Approach**

This *Strategy* was developed through the following science-based steps:

*STEP 1: Identify which species are of greatest conservation need (see Section 3.1).*



All vertebrate, native wildlife species in Wisconsin were evaluated for their level of risk using the following seven criteria:

Global relative abundance  
Global distribution  
Global threats  
Global population trend

State rarity  
State threats  
State population trend

Within each of the **vertebrate** major taxonomic groups (birds, fish, herptiles, and mammals), each species was given a score ranging from 1 to 5 for each of the criteria based on scientific literature and the best professional judgment of a team of experts. These scores were then used to calculate mean risk scores and select the Species of Greatest Conservation Need (SGCN).

**Invertebrates** (Chapter 4) were assessed using a modified process that incorporated information on the status of knowledge for different invertebrate taxa groups. Although a considerable amount of information has been gathered over the last decade, data on invertebrate species distribution, occurrence, population trend, and life history are insufficient to conduct the type of detailed evaluation that was carried out for vertebrates. For some groups of invertebrates, however, more information does exist. For example, it is known that 51 species of freshwater mussels are found in the state, primarily in warmwater rivers. Of these, 26 (over 50%) are rare or declining and are considered Species of Greatest Conservation Need.

Since little or no distribution data exists for most invertebrate Species of Greatest Conservation Need, it was difficult, if not impossible, to assess their distribution by habitat association (Step 2 below) or broad ecological region (Step 3 below). Further, planning at large scales lacks relevance for most invertebrates, which often have specific microhabitat requirements that cannot be addressed adequately at broader scales.

*STEP 2: Identify the habitats required by the Species of Greatest Conservation Need (see Section 3.3).*



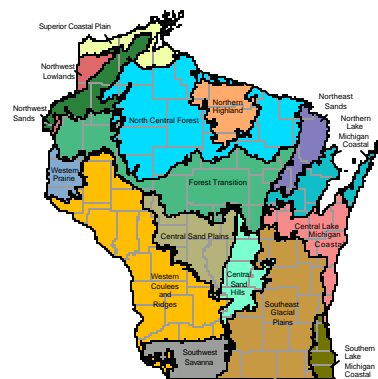
For each of the **vertebrate** Species of Greatest Conservation Need, the critical habitats needed to support healthy populations within Wisconsin were identified. For terrestrial and wetland habitats, the natural community classification system developed by the DNR's Natural Heritage Inventory program was used. For aquatic habitats, a simplified system of river, stream, and lake communities was developed by DNR fishery researchers. A total of 66 natural communities were used in the analysis.

These 66 natural communities were grouped within eight major habitat categories: northern forest, southern forest, oak savanna, barrens, grassland, wetland, aquatic, and miscellaneous. In addition, one "surrogate" community (surrogate grasslands) was identified.

**STEP 3: Identify species distributions within Wisconsin** (see Section 3.2).



Each of the vertebrate Species of Greatest Conservation Need was evaluated for its probability of occurring within each of the 16 Ecological Landscapes of Wisconsin. These 16 ecologically similar regions were identified based on climate, soils, existing and historic vegetation, topography, types of aquatic features present, and other factors (Figure 1).



**Figure 1. Ecological Landscapes of Wisconsin**

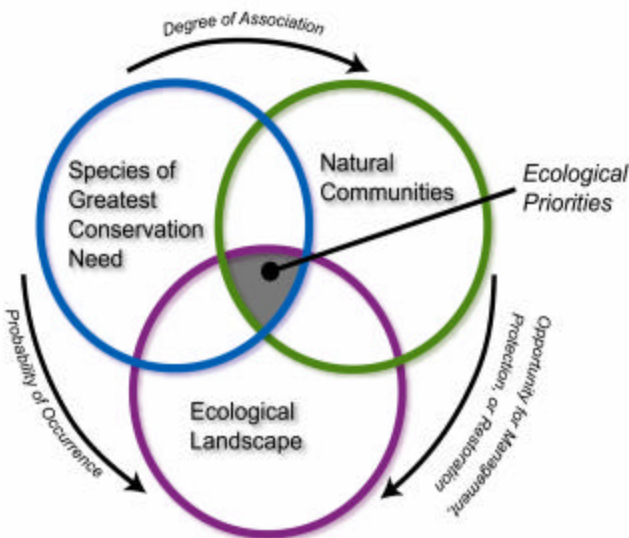
Similarly, each Ecological Landscape was evaluated to determine which of the natural communities occurring within it present the best opportunities for management and restoration. For example, in the Southwest Savanna Ecological Landscape, there are major opportunities to sustain and manage oak openings, oak woodlands, and dry, dry-mesic, and mesic prairies.

**STEP 4: Identify issues, threats and conservation actions.**

The issues and threats facing each of the vertebrate Species of Greatest Conservation Need and the natural communities they inhabit were identified and priority conservation actions to address these problems were described. Many of the threats and conservation actions were related to habitat issues and may be coordinated to simultaneously address the needs of multiple species. Implementing the conservation actions presented in the *Strategy* will significantly improve conditions for these species, but they are not requirements or mandates.

Threats and issues affecting invertebrate populations and related priority conservation actions are also discussed to the extent possible for species groups in the invertebrate chapter (Chapter 4).

**STEP 5: Identify priority ecological opportunities.**



**Figure 2. Ecological Priorities Diagram**

The components of the first three steps were then integrated to identify ecological priorities (Figure 2). Thus, for a Species of Greatest Conservation Need, there are lists in Section 3.1 of which Ecological Landscape-natural community combinations are of highest ecological priority. Similarly, for each Ecological Landscape there are lists in Section 3.2 of priority natural community-species opportunities. And finally, for each natural community, there are lists in Section 3.3 of which Ecological Landscapes represent the best management opportunities and which Species of Greatest Conservation Need are most likely to benefit from management actions within those landscapes.

As a result, readers can “enter” the document from either a species, natural community, or Ecological Landscape perspective.

*STEP 6: Develop monitoring plans and opportunities to partner with various organizations.*

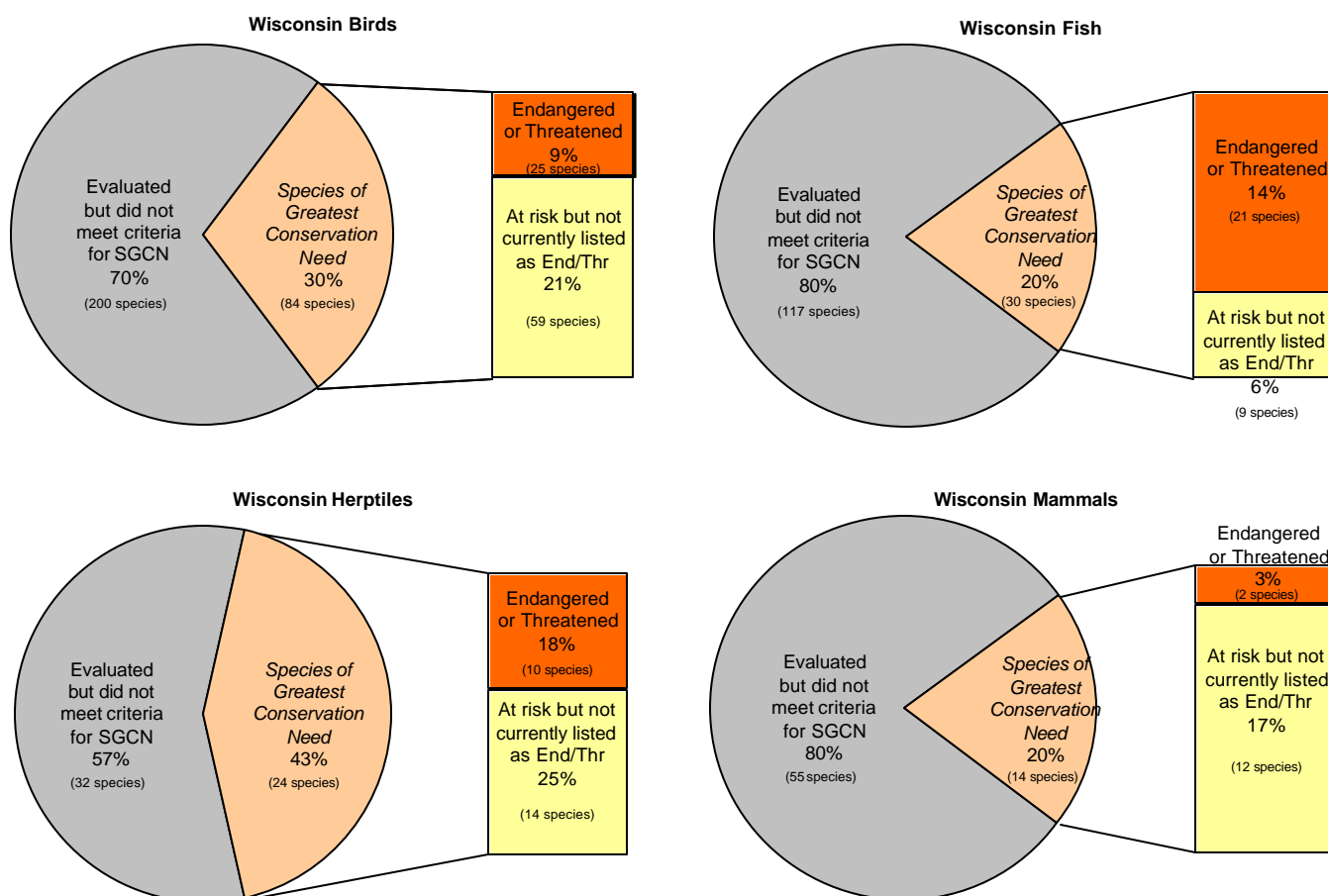
The *Strategy* presents an overview of the wide variety of existing monitoring efforts related to Species of Greatest Conservation Need, potential gaps, and opportunities to measure the implementation of priority conservation actions (Chapter 5). The *Strategy* also describes how conservation partners and the public have been involved in its development, opportunities for continued participation (Chapter 6), and the ways in which the *Strategy* will adapt to new information and changes (Chapter 7).

## Summary of Results

### By Species

Species of Greatest Conservation Need include both species already listed by either the federal or state government as Endangered or Threatened, as well as species that are at significant risk but not yet on the state or federal Endangered or Threatened species lists.

Because each taxa group was evaluated independently, there is a range in the corresponding number of Species of Greatest Conservation Need within taxa groups. Although some differences can be seen at this coarse level, readers are encouraged to look beyond these “raw numbers” to evaluate the patterns of conservation need that emerge at natural community and Ecological Landscape perspectives. The number and percentage of vertebrate species considered of greatest conservation need within each taxonomic group can be seen in the charts below.



The full list of vertebrate Species of Greatest Conservation Need is presented in the following table. The table is organized taxonomically and includes each species' relative abundance in Wisconsin; that is, how the size and extent of all populations in Wisconsin compare with total size and extent of all populations across the rest of the species' range. The relative abundance categories (high, moderate to low, and very low) were not created to prioritize vertebrate species, but rather as another tool for analysis. These categories are further defined in Section 2.3.

**Table 1. Species of Greatest Conservation Need in Wisconsin.**

Species Common Name	Relative Abundance	Species Common Name	Relative Abundance	Species Common Name	Relative Abundance
<b>BIRDS</b>					
Horned Grebe	Mod - Low	Upland Sandpiper	Mod - Low	Loggerhead Shrike	Very Low
Red-necked Grebe	Mod - Low	Whimbrel	Mod - Low	Bell's Vireo	Mod - Low
American Bittern	High	Hudsonian Godwit	Mod - Low	Blue-winged Warbler	High
Great Egret	Mod - Low	Marbled Godwit	Very Low	Golden-winged Warbler	High
Snowy Egret	Very Low	Dunlin	Mod - Low	Black-throated Blue Warbler	Mod - Low
Yellow-crowned Night-Heron	Mod - Low	Buff-breasted Sandpiper	Mod - Low	Yellow-throated Warbler	Very Low
Trumpeter Swan	Mod - Low	Short-billed Dowitcher	Mod - Low	Kirtland's Warbler	Very Low
American Black Duck	Mod - Low	American Woodcock	High	Cerulean Warbler	Mod - Low
Blue-winged Teal	Mod - Low	Wilson's Phalarope	Mod - Low	Prothonotary Warbler	Mod - Low
Canvasback	High	Caspian Tern	Mod - Low	Worm-eating Warbler	Mod - Low
Redhead	Mod - Low	Common Tern	Mod - Low	Louisiana Waterthrush	Mod - Low
Lesser Scaup	High	Forster's Tern	Mod - Low	Kentucky Warbler	Mod - Low
Osprey	Mod - Low	Black Tern	Mod - Low	Connecticut Warbler	High
Bald Eagle	High	Black-billed Cuckoo	High	Hooded Warbler	Mod - Low
Northern Harrier	High	Yellow-billed Cuckoo	Mod - Low	Canada Warbler	High
Northern Goshawk	Mod - Low	Barn Owl	Very Low	Dickcissel	Mod - Low
Red-shouldered Hawk	Mod - Low	Short-eared Owl	Mod - Low	Field Sparrow	High
Peregrine Falcon	Mod - Low	Whip-poor-will	Mod - Low	Vesper Sparrow	High
Spruce Grouse	Mod - Low	Red-headed Woodpecker	High	Lark Sparrow	Mod - Low
Greater Prairie-Chicken	Mod - Low	Black-backed Woodpecker	Mod - Low	Grasshopper Sparrow	Mod - Low
Sharp-tailed Grouse	Mod - Low	Olive-sided Flycatcher	Mod - Low	Henslow's Sparrow	High
Northern Bobwhite	Mod - Low	Acadian Flycatcher	Mod - Low	Le Conte's Sparrow	Mod - Low
Yellow Rail	Mod - Low	Willow Flycatcher	High	Nelson's Sharp-tailed Sparrow	Mod - Low
King Rail	Mod - Low	Least Flycatcher	High	Bobolink	High
Whooping Crane	Mod - Low	Boreal Chickadee	Mod - Low	Eastern Meadowlark	High
American Golden Plover	Mod - Low	Veery	High	Western Meadowlark	Mod - Low
Piping Plover	Very Low	Wood Thrush	Mod - Low	Rusty Blackbird	Mod - Low
Solitary Sandpiper	Mod - Low	Brown Thrasher	High	Red Crossbill	Mod - Low

**Table 1. Species of Greatest Conservation Need in Wisconsin (cont.)**

Species Common Name	Relative Abundance	Species Common Name	Relative Abundance	Species Common Name	Relative Abundance
<b>FISHES</b>					
Lake Sturgeon	High	Ozark Minnow	Mod - Low	Greater Redhorse	High
Paddlefish	Mod - Low	Gravel Chub	Mod - Low	Slender Madtom	Mod - Low
American Eel	Very Low	Striped Shiner	Very Low	Banded Killifish	Mod - Low
Skipjack Herring	Very Low	Redfin Shiner	Mod - Low	Starhead Topminnow	Mod - Low
Goldeye	Very Low	Shoal Chub (Speckled Chub)	Mod - Low	Longear Sunfish	Mod - Low
Kiwi	High	Blue Sucker	High	Crystal Darter	High
Shortjaw Cisco	High	Lake Chubsucker	Mod - Low	Western Sand Darter	High
Redside Dace	High	Black Buffalo	Mod - Low	Bluntnose Darter	Very Low
Pallid Shiner	Very Low	River Redhorse	Mod - Low	Least Darter	Mod - Low
Pugnose Shiner	High	Black Redhorse	Mod - Low	Gilt Darter	Mod - Low
<b>HERPILES</b>					
Four-toed Salamander	Mod - Low	Ornate Box Turtle	Mod - Low	Black Rat Snake	Mod - Low
Mudpuppy	Mod - Low	Midland Smooth Softshell Turtle	Mod - Low	Bullsnake	Mod - Low
Blanchard's Cricket Frog	Mod - Low	Western Slender Glass Lizard	Mod - Low	Queen Snake	Mod - Low
Boreal Chorus Frog	Mod - Low	Northern Prairie Skink	Mod - Low	Butler's Garter Snake	High
Pickerel Frog	Mod - Low	Prairie Racerunner	Mod - Low	Western Ribbon Snake	Very Low
Mink Frog	Mod - Low	Western Worm Snake	Very Low	Northern Ribbon Snake	Mod - Low
Wood Turtle	Mod - Low	Yellow-bellied Racer	Mod - Low	Timber Rattlesnake	Mod - Low
Blanding's Turtle	High	Prairie Ringneck Snake	Mod - Low	Eastern Massasauga Rattlesnake	Mod - Low
<b>MAMMALS</b>					
Water Shrew	Mod - Low	White-tailed Jackrabbit	Very Low	Woodland Jumping Mouse	Mod - Low
Northern Long-eared Bat	Mod - Low	Franklin's Ground Squirrel	Mod - Low	Gray Wolf	Mod - Low
Silver-haired Bat	Mod - Low	Northern Flying Squirrel	Mod - Low	American Marten	Mod - Low
Eastern Red Bat	Mod - Low	Prairie Vole	Mod - Low	Moose	Very Low
Hoary Bat	Mod - Low	Woodland Vole	Mod - Low		

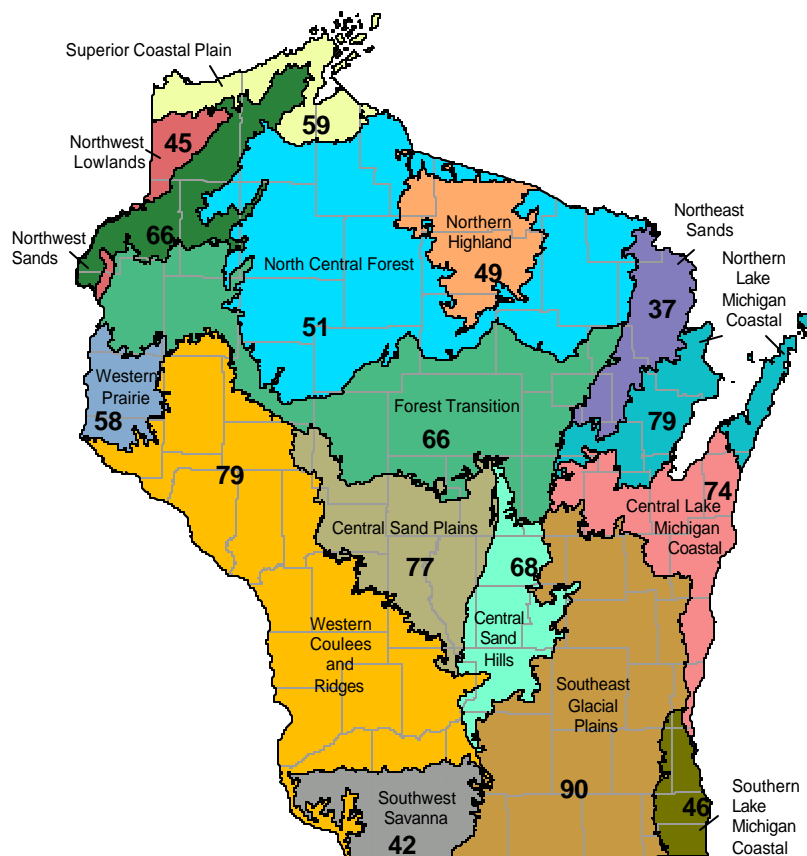
Of the more than 25,000 species of **invertebrates** native to Wisconsin, 530 species in three major taxonomic groups were identified as Species of Greatest Conservation Need. The full list of invertebrate Species of Greatest Conservation Need can be found in Section 4.3.

	Number of Species of Greatest Conservation Need
Non-arthropod invertebrates (e.g., mussels and snails)	58
Non-insect arthropods (e.g., crayfish and spiders)	22
Insects (e.g., butterflies and beetles)	450
<b>Total</b>	<b>530</b>

### By Ecological Landscape

There is a wide range in the number of vertebrate Species of Greatest Conservation Need occurring in different parts of the state. The map at right shows the number of vertebrate Species of Greatest Conservation Need with a high or moderate degree of probability of occurring in each Ecological Landscape.

There are, of course, many factors that influence this range, including size of the landscape, current and past land uses, diversity of habitats, and patch sizes. Although some species have populations throughout an Ecological Landscape, most are limited to smaller areas of the landscape, particularly in those landscapes that are very large.



### By Natural Community

As with Ecological Landscapes, there is a wide range in the number of Species of Greatest Conservation Need associated with each natural community. Some of the reasons for this variation include the community's abundance and geographic extent (both current and historical), the degree of fragmentation of remaining occurrences, loss of certain successional stages, and impacts from invasive species.

The twenty natural communities with the highest number of vertebrate Species of Greatest Conservation Need that are significantly or moderately associated with the natural community are shown in Table 2.

**Table 2. Natural communities with the highest number of vertebrate SGCN.**

<div> <div># of vertebrate SGCN significantly or moderately associated with the natural community</div> <div>Natural Community</div> </div>		<div> <div># of vertebrate SGCN significantly or moderately associated with the natural community</div> <div>Natural Community</div> </div>	
Warmwater Rivers	40	Submergent Aquatic	27
Dry-Mesic Prairie	39	Surrogate Prairie Grasslands	26
Emergent Aquatic	39	Northern Sedge Meadow	26
Floodplain Forest	35	Open Bog	26
Dry Prairie	31	Mesic Prairie	25
Inland Lakes	29	Oak Opening	25
Oak Barrens	28	Sand Prairie	24
Pine Barrens	28	Southern Mesic Forest	24
Southern Dry-Mesic Forest	27	Southern Tamarack Swamp	24
Shrub-carr	27	Southern Sedge Meadow	24

## **History of the State Wildlife Grant Program**

Historically, both in Wisconsin and nationally, funding for wildlife conservation predominantly has come from hunting and fishing licenses and federal excise taxes on hunting and fishing equipment (Pittman-Robertson Wildlife Restoration Act and Dingell-Johnson Sportfish Restoration Act). Conservation efforts funded by these programs have traditionally focused on the protection and restoration of habitats used by species that are hunted or fished. But, many non-game species, including many rare species, have benefited tremendously from the forests, grasslands and wetlands that have been protected and restored by hunting and fishing organizations and agencies over the years. In fact, the list of rare and declining species would likely be far greater had it not been for the remarkable conservation work conducted throughout the state over the last one hundred years.

In addition to these traditional conservation funding sources, more recently there has been some funding from the federal and state governments to protect and restore Endangered and Threatened species and their habitats. Wisconsin also relies on donations from the public to fund a considerable amount of work on endangered resources. Of course, many game species and other non-game species also benefit from efforts to protect various rare species and their habitats.

Despite the ongoing efforts to maintain wildlife, the Endangered and Threatened species list continues to grow, and maybe more ominously, the number of species not yet listed but with seriously declining populations has grown significantly over the last thirty years. Once species decline to the point where they are classified as Endangered or Threatened, significant funding and staff resources are generally required to protect remaining populations and their habitats and to work to restore both to a healthy, viable state. Indeed, recovery and restoration costs are often much greater than would have been required to prevent the species' decline initially. Recognizing the need to take action to *prevent* wildlife decline, more than 3,000 groups across the country came together as the Teaming With Wildlife coalition. This coalition includes wildlife managers, conservationists, hunters and anglers, businesses, and many others who support the goal of restoring and conserving our nation's wildlife.

To initiate a proactive approach and protect species before serious declines occur, Congress authorized the U.S. Fish & Wildlife Service to implement a new program to fill this funding gap. The **State Wildlife Grants (SWG)** program provides federal funding to every state and territory to conserve its wildlife species of greatest conservation need. It is the only federal program that provides substantial funding to address this issue in every state.

Since the inception of the SWG program in 2001, Wisconsin has received about \$1 million each year to fund a variety of conservation initiatives. To remain eligible for continued SWG funding, Wisconsin (and all other states and territories) must submit for approval a Comprehensive Wildlife Conservation Plan/Strategy to the U.S. Fish & Wildlife Service by October 1, 2005.

## **Partners involved in the development of the Strategy**

A large group of experts representing a broad range of conservation interests from throughout the state were invited to participate on an Advisory Team. Twenty individuals representing 18 different organizations (including state and federal agencies, private wildlife conservation organizations, the academic community, Native American Tribes, lake groups, and many others) agreed to be active members of the Advisory Team. In addition over 50 species experts representing a range of organizations provided technical expertise throughout the process.



## A User's Guide to the Strategy

This document contains an enormous amount of information that can be overwhelming. Although it may seem easy to get lost in the details, readers are encouraged to remain mindful of a couple of issues.

- Use the Strategy to identify how your organization's mission and goals relate to and match up with the priority conservation needs. Some questions to consider include the following: What actions, in what part of the state, could our organization implement? Which actions would provide the most benefits for the greatest number of Species of Greatest Conservation Need?
- Be aware of groups of species with similar needs. Readers are encouraged to use the information in the Strategy as starting points in planning and implementing various conservation efforts. For example, projects focused on a particular species-natural community-Ecological Landscape combination may be able to incorporate the needs of many other Species of Greatest Conservation Need (as well as other species that are not rare or declining) that also occur in that natural community and that Ecological Landscape.
- *Recognize the complexity of habitat management. By its nature, managing habitats will positively affect some species and negatively affect others. This is expected, and land managers have long wrestled with how best to balance the needs of multiple species and habitats for a variety of conservation and economic uses.* For example, managing for older growth forests at a location may benefit some species, but may not benefit (in fact, may displace) others that require forests at earlier successional stages. Similarly, thinning a woodland to create a savanna aspect will likely displace species that require "forest interior" conditions.

Further complicating habitat management issues is the fact that, in some cases, several Species of Greatest Conservation Need may be associated with a particular natural community, but they may have different management needs or may use the habitat at different times of the year or at different life stages. At times, managing for one or several Species of Greatest Conservation Need may conflict with the needs of other Species of Greatest Conservation Need or other more common species.

*There are neither "right" nor "wrong" ways to manage property – just different ways that result in different outcomes. It is often beneficial to approach this complexity by looking beyond a specific property and examining how it fits into a broader area. This larger scale assessment should incorporate not only ecological opportunities but also economic issues, social needs, and political factors.*

- Ecological priorities and priority conservation actions are identified at various scales (species level, natural community, Ecological Landscape). The conservation actions presented here will significantly help the Species of Greatest Conservation Need, but they are not requirements. The actions and priorities are intended to provide a "menu" of opportunities that may or may not be appropriate at any given place or point in time.
- Recognize that the Strategy is just that, a strategy to help guide conservation efforts that keep Wisconsin wildlife from being endangered or threatened. It is a guidance document, not a regulatory document. And, as complete and comprehensive as it is, the document is not without limitations. For example, by virtue of federal guidance, it focuses only on animals. Considerable work lies ahead in identifying near- and long-term priorities (both species and their habitats as well as conservation actions). Maybe most importantly, the Department and its partners will need to integrate the findings of this document with the Fish & Wildlife Plan, the Land Legacy Report, the SCORP, the Statewide Forest Plan, and many other plans as we approach our collective work.

### **Some Examples of Using the Strategy**

#### *If you are interested in management of a particular property or area*

As an example, if you are developing management plans for a tract of woods in northern Wisconsin, you might be interested to know which habitats represent major opportunities for management and conservation in that part of the state and which Species of Greatest Conservation Need are most likely to occur there. Thus, you might want to “enter” the document through the particular Ecological Landscape of interest (Section 3.2) to find information on the overarching needs and opportunities in the landscape as well as lists of those natural communities which are major and important management opportunities. More detailed information about management considerations for each natural community can be found in Section 3.3. Within your Ecological Landscape you will also find lists of those Species of Greatest Conservation Need with high, moderate, or low degrees of probability of occurring in the landscape. More detailed information about management considerations for these species can then be found in Section 3.1. Together with forest stand data and other economic factors, this set of information can help guide on-the-ground management decisions to benefit a wide range of species – rare and common, game and non-game.

#### *If you are interested in a particular species or taxonomic group*

If you are involved with management of a particular species or group of species, you can “enter” the document through a taxonomic group in Section 3.1 and then find information about the specific species of interest to you. For example, if you are interested in reptiles and amphibians (a.k.a. “herptiles”) that are of greatest conservation need you can go straight to Section 3.1.4. Here you will find information on the overall taxa group as well as individual descriptions of threats and issues facing each species and the corresponding conservation actions that can help improve conditions for them. In addition, there are listings of the Ecological Landscape-natural community combinations that represent the best ecological opportunities in the state for conservation efforts targeting the species.

From the species-specific information you can then go to Sections 3.2 and 3.3 to find what other species occur in these habitats in particular Ecological Landscapes. This broader habitat-based level of analysis can enable more “bang for the buck” from various conservation actions.

#### *If you are interested in a particular habitat*

If you are interested in a particular habitat you can “enter” the document through Section 3.3. Here you will find information on the Species of Greatest Conservation Need that are significantly and moderately associated with the habitat as well as the Ecological Landscapes where the best management and restoration opportunities occur for the habitat. For example, if you are interested in native grasslands you can go to Section 3.3.3 and find lists of the vertebrate Species of Greatest Conservation Need significantly or moderately associated with each of the grassland natural communities. You will also find information on which Ecological Landscapes are major or important opportunities for management and restoration of native grasslands. And finally, there is substantial information (from both statewide and Ecological Landscape perspectives) about threats and issues confronting our native grasslands as well as associated conservation actions.

Regardless of how you intend to apply the data (whether for research, education, grant writing, or on-the-ground management decisions) or which way you choose to “enter” the document, you’re encouraged to move from one section to another. This approach should help put the ecological priorities listed within each section into a broader perspective and enhance the value, effectiveness and impact of your conservation work.